195. ALCOHOL.
Mashing-
Processes.

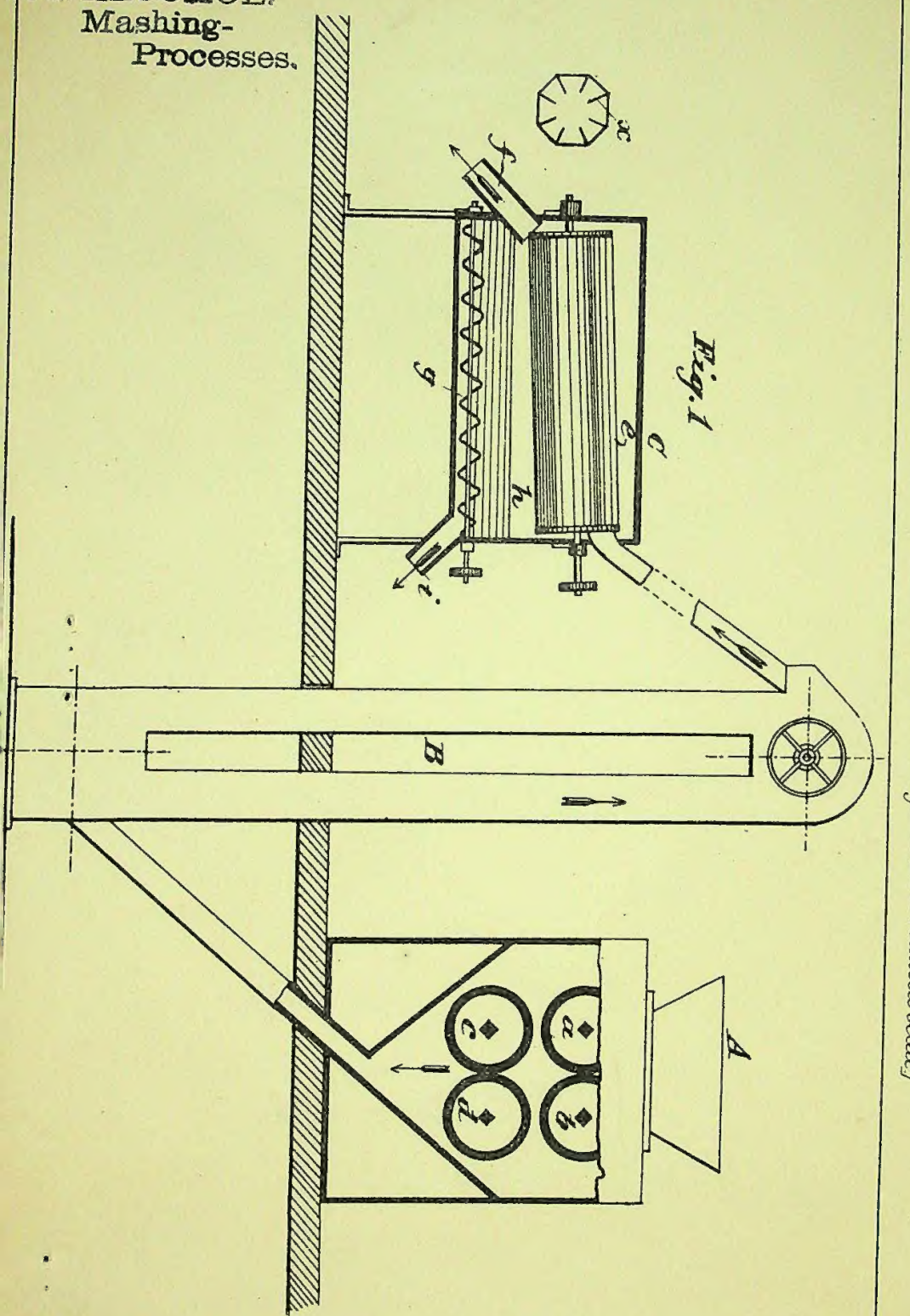

Fig. 1.

[This Drawing is a reproduction of the Original on a reduced scale.]

London: Printed by Darling and Son Ltd.
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N° 2684 A.D. 1896

Date of Application, 5th Feb., 1896—Accepted, 20th June, 1896

COMPLETE SPECIFICATION.

Improvements in Apparatus for Producing Crushed Malt, and a Process of Producing Wort from the said Malt.

I, BERNHARD ROTHENBÜCHER, of 1 Gormannstrasse, Berlin, in the Empire of Germany, Master Brewer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement :—

This invention relates to apparatus for producing crushed malt and to a process of producing wort from the said malt.

The wort produced in accordance with the brewing processes as hitherto used, is, as regards the purity of its flavour and richness, always influenced by the husks and malt germs or acrospire of malt mashed therewith, that is to say the wort receives a peculiar and harsh flavour, which in spite of the lengthy soaking of the barley in the soaking tub, nevertheless remains partly adherent to the malt since by the action of the warm water or by boiling the mash the products extracted from the husks and malt germs become more soluble and during the boiling, the fermenting and storing process of the beer will pass over into the wort and thereby produce all those defects which prove pernicious to many a brewer since one boiled quantity after the other has to be thrown away. From these defects the small provincial brewers especially have to suffer, if they are compelled to get their supply of barley from their customers, which material according to soil and harvest is partly suitable and partly unsuitable to serve as malting barley, whereas the greater part of the large breweries obtain their barley from Bohemia, Moravia, Hungary and other countries, principally on account of the fact that the barley supplied from the beforementioned countries is very fine and its husks are fairly thin.

From this fact results a great loss of material to the farmer since his barley is, owing to the thickness of its husks and the like, not suitable to serve as malting-barley, because of the smaller yield of material extracted therefrom, which means a loss of capital to the brewer in general and is more especially felt by the small provincial brewer, this so much the more as the latter has in addition to cope with many difficulties of technical nature and we have to bear in mind the fact that foreign beer is mostly preferred to our own beer, exclusively on account of its flavour. The advantages of my process relating to the use of crushed malt, from which the husks and malt germs or acrospire have been removed, for the preparation of wort, are the following :

(1) A larger yield of material extracted from the crushed malt, since the starchy substance of the malt is completely ground down to powder and is free from husks and malt germs and consequently permits the crushed malt of being more thoroughly lixiviated so that the yield in malt taken as a standard amount extracted is practically equal to the yield resulting from the laboratory analysis.

(2) A saving of coal and workmanship owing to the reduction of volume.

(3) More efficient utilization of the brewing appliances.

(4) Omission of the clearing vat.

(5) Applicability of any kind of barley for malting.

(6) Pure taste of the beer or wort respectively.

(7) The obtaining of pure yeast.

[*Price 8d.*]

(8) Speedier break-up in the hop-boiler and fermenting vat.

(9) Equalization of the difference existing between large and small breweries as regards yield and taste of material.

For producing such crushed malt which is free from husks and malt germs, I utilize the apparatus which is shown in three constructional forms in the accompanying drawings. These constructional devices are dependent upon the management and locality of the brewery. In these drawings

Figure 1 represents the apparatus in its simplest form.

Figure 2 is an apparatus for the double treatment of the malt.

Figure 3 is a modification of the device shown in Figure 1.

The method of operation is as follows :

The malt brought into the hopper of the crushing mill, passes between a pair of preliminary smooth rollers *a b*, where it is flattened. During this operation the interior farinaceous parts penetrate the softer and glutinous substances inside the outer layer thus rendering the same floury.

After having passed the preliminary or first pair of rollers the flattened malt is passed through one or a number of further smooth rollers *c d*—according to the quality of the malt—which latter rollers completely separate the farinaceous substance from the husks. The same effect is produced upon the acrospire by their double passage through the rollers. The whole product passes according to Figure 1 into an elevator B which conveys it to the separator C, or according to Figure 2 immediately into the separator C. The latter consists of a box *h* containing a polygonal sieve-cylinder *e* with internal rigid vanes *x* and a conveying screw or worm *g* and with discharge openings for the crushed malt and for the husks and acrospire, respectively.

The product passing into the cylinder is separated as it revolves in the latter, the crushed material falls through the meshes into the conveying screw, whilst the husks and acrospire temporarily remain in the cylinder and are thence separately discharged through the discharge opening. The crushed malt is discharged by the conveying screw through an opening *i*. When the highest yield of crushed malt is desired to be obtained, that is to say when the husk is to be thoroughly freed from any adherent farinaceous and other substance, the device, shown in Figure 2, is employed.

After the malt having passed the two pairs of rollers *a b* and *c d* respectively, and the sieve-cylinder *e*, the crushed substance arrives at the discharge opening *i*, which may have the form of an inclined spout, whilst the husks and acrospire are conveyed between another pair of rollers, where they are subjected to a second treatment and are then again passed into a sieve-cylinder of the same kind as the above described. After the separation has thus been effected, the remainder of the crushed substance thus obtained is likewise passed by the conveying screw through the spout *i* and is thus mixed with the first obtained grit, while the husks and acrospire are discharged into the open.

The third constructional device represents an apparatus, in which the crushed malt, after passing the rollers, enters directly the cylinder, whilst the husks may or may not be brought again into the hopper in order to be passed a second time through the rollers and the cylinder.

Process of obtaining the wort by the treatment of crushed malt free from husks and acrospire ;—

The crushed malt thus obtained is then mashed in the same manner as has hitherto been employed in the brewing process.

In mashing a gauze cylinder charged with a weight at its bottom, is placed into the mash. After the mash has settled down and been broken up, a suction pipe is placed into the gauze cylinder and subsequently the wort is pumped through a filter into the hop-boiler. The after-mashing operation is effected in the same manner. The filtration may also be effected by the aid of a sponge. The brewed product is, thus free from any impure flavour as would result from husks and acrospire, for the reason that these latter substances are kept separate and are not

boiled in connection with the malt proper, so that the extract from the said husks and acrospire does not come into contact with the wort.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is :—

1. The process of obtaining and producing beer-wort free from impure flavour by mashing the crushed malt, which has first been freed from husks and malt germs or acrospire of malt by passing it through several pairs of rollers and bolting it in sieve-cylinders and subsequently separating the wort from the extracted residues by filtration or sponge-clearing substantially as described.

2. For obtaining the crushed malt, an apparatus consisting of several pairs of rollers in connection with a sieve-cylinder or cylinders and elevator and devices for separating the husks and malt germs or acrospire of malt from the crushed malt substantially as described.

3. A modification of the device, described in the second claim, the characteristic feature being that the said device is doubled substantially as described.

Dated this 5th day of February 1896.

HASELTINE, LAKE & Co.,
45 Southampton Buildings, London, W.C., Agents for the Applicant.

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